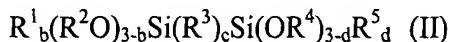


What is claimed is:

1. A composition comprising an organic polysilica partial condensate of one or more silanes of formula (I) and one or more silanes of formula (II):



wherein R is hydrogen, (C<sub>1</sub>-C<sub>8</sub>)alkyl, (C<sub>7</sub>-C<sub>12</sub>)arylalkyl, substituted (C<sub>7</sub>-C<sub>12</sub>)arylalkyl, aryl, and substituted aryl; Y is any hydrolyzable group; a is an integer of 1 to 2; R<sup>1</sup>, R<sup>2</sup>, R<sup>4</sup> and R<sup>5</sup> are independently selected from hydrogen, (C<sub>1</sub>-C<sub>6</sub>)alkyl, (C<sub>7</sub>-C<sub>12</sub>)arylalkyl, substituted (C<sub>7</sub>-C<sub>12</sub>)arylalkyl, aryl, and substituted aryl; R<sup>3</sup> is (C<sub>1</sub>-C<sub>10</sub>)alkyl, -(CH<sub>2</sub>)<sub>h</sub>-, -(CH<sub>2</sub>)<sub>h1</sub>-E<sub>k</sub>-(CH<sub>2</sub>)<sub>h2</sub>-, -(CH<sub>2</sub>)<sub>h</sub>-Z, arylene, substituted arylene, or arylene ether; E is oxygen, NR<sup>6</sup> or Z; Z is aryl or substituted aryl; R<sup>6</sup> is hydrogen, (C<sub>1</sub>-C<sub>6</sub>)alkyl, aryl or substituted aryl; b and d are each an integer of 0 to 2; c is an integer of 0 to 6; and h, h1, h2 and k are independently an integer from 1 to 6; provided that at least one of R, R<sup>1</sup>, R<sup>3</sup> and R<sup>5</sup> is not hydrogen; wherein the partial condensate has a weight average molecular weight of  $\leq 10,000$ .

2. The composition of claim 1 wherein R<sup>3</sup> is selected from the group consisting of methylene, ethylene, propylene, butylene, hexylene, norbornylene, cycloheylene, phenylene, phenylene ether, naphthylene and -CH<sub>2</sub>-C<sub>6</sub>H<sub>4</sub>-CH<sub>2</sub>-.

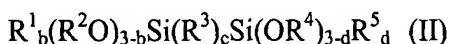
3. The composition of claim 1 wherein the organic polysilica partial condensate further comprises one or more silanes of the formula



wherein M is aluminum, titanium, zirconium, silicon, magnesium, or boron; R<sup>11</sup> is (C<sub>1</sub>-C<sub>6</sub>)alkyl, acyl, or Si(OR<sup>12</sup>)<sub>3</sub>; R<sup>12</sup> is (C<sub>1</sub>-C<sub>6</sub>)alkyl or acyl; and n is the valence of M.

4. The composition of claim 1 wherein the partial condensate has a weight average molecular weight in the range of 2500 to 10,000.

5. A method of preparing an organic polysilica film comprising the step of providing a partial condensate of one or more silanes of formula (I) and one or more silanes of formula (II):



wherein R is hydrogen, (C<sub>1</sub>-C<sub>8</sub>)alkyl, (C<sub>7</sub>-C<sub>12</sub>)arylalkyl, substituted (C<sub>7</sub>-C<sub>12</sub>)arylalkyl, aryl, and substituted aryl; Y is any hydrolyzable group; a is an integer of 1 to 2; R<sup>1</sup>, R<sup>2</sup>, R<sup>4</sup> and R<sup>5</sup> are independently selected from hydrogen, (C<sub>1</sub>-C<sub>6</sub>)alkyl, (C<sub>7</sub>-C<sub>12</sub>)arylalkyl, substituted (C<sub>7</sub>-C<sub>12</sub>)arylalkyl, aryl, and substituted aryl; R<sup>3</sup> is (C<sub>1</sub>-C<sub>10</sub>)alkyl, -(CH<sub>2</sub>)<sub>h</sub>-, -(CH<sub>2</sub>)<sub>h1</sub>-E<sub>k</sub>-(CH<sub>2</sub>)<sub>h2</sub>-, -(CH<sub>2</sub>)<sub>h</sub>-Z, arylene, substituted arylene, or arylene ether; E is oxygen, NR<sup>6</sup> or Z; Z is aryl or substituted aryl; R<sup>6</sup> is hydrogen, (C<sub>1</sub>-C<sub>6</sub>)alkyl, aryl or substituted aryl; b and d are each an integer of 0 to 2; c is an integer of 0 to 6; and h, h1, h2 and k are independently an integer from 1 to 6; provided that at least one of R, R<sup>1</sup>, R<sup>3</sup> and R<sup>5</sup> is not hydrogen; wherein the partial condensate has a weight average molecular weight of ≤ 10,000.

6. The method of claim 5 wherein the partial condensate has a weight average molecular weight in the range of 2500 to 10,000.

7. The method of claim 5 wherein partial condensate further comprises one or more silanes of the formula

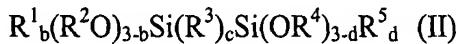


wherein M is aluminum, titanium, zirconium, silicon, magnesium, or boron; R<sup>11</sup> is (C<sub>1</sub>-C<sub>6</sub>)alkyl, acyl, or Si(OR<sup>12</sup>)<sub>3</sub>; R<sup>12</sup> is (C<sub>1</sub>-C<sub>6</sub>)alkyl or acyl; and n is the valence of M.

8. The method of claim 5 wherein R<sup>3</sup> is selected from the group consisting of methylene, ethylene, propylene, butylene, hexylene, norbornylene, cycloheylene, phenylene, phenylene ether, naphthylene and -CH<sub>2</sub>-C<sub>6</sub>H<sub>4</sub>-CH<sub>2</sub>-.

9. A method of manufacturing a device comprising the steps of:

a) disposing on a substrate an organic polysilica partial condensate of one or more silanes of formula (I) and one or more silanes of formula (II):



wherein R is hydrogen, (C<sub>1</sub>-C<sub>8</sub>)alkyl, (C<sub>7</sub>-C<sub>12</sub>)arylalkyl, substituted (C<sub>7</sub>-C<sub>12</sub>)arylalkyl, aryl, and substituted aryl; Y is any hydrolyzable group; a is an integer of 1 to 2; R<sup>1</sup>, R<sup>2</sup>, R<sup>4</sup> and R<sup>5</sup> are independently selected from hydrogen, (C<sub>1</sub>-C<sub>6</sub>)alkyl, (C<sub>7</sub>-C<sub>12</sub>)arylalkyl, substituted (C<sub>7</sub>-C<sub>12</sub>)arylalkyl, aryl, and substituted aryl; R<sup>3</sup> is (C<sub>1</sub>-C<sub>10</sub>)alkyl, -(CH<sub>2</sub>)<sub>h</sub>-, -(CH<sub>2</sub>)<sub>h1</sub>-E<sub>k</sub>-(CH<sub>2</sub>)<sub>h2</sub>-, -(CH<sub>2</sub>)<sub>h</sub>-Z, arylene, substituted arylene, or arylene ether; E is oxygen, NR<sup>6</sup> or Z; Z is aryl or substituted aryl; R<sup>6</sup> is hydrogen, (C<sub>1</sub>-C<sub>6</sub>)alkyl, aryl or substituted aryl; b and d are each an integer of 0 to 2; c is an integer of 0 to 6; and h, h1, h2 and k are independently an integer from 1 to 6; provided that at least one of R, R<sup>1</sup>, R<sup>3</sup> and R<sup>5</sup> is not hydrogen; wherein the partial condensate has a weight average molecular weight of ≤ 10,000.

(CH<sub>2</sub>)<sub>b</sub>-Z, arylene, substituted arylene, or arylene ether; E is oxygen, NR<sup>6</sup> or Z; Z is aryl or substituted aryl; R<sup>6</sup> is hydrogen, (C<sub>1</sub>-C<sub>6</sub>)alkyl, aryl or substituted aryl; b and d are each an integer of 0 to 2; c is an integer of 0 to 6; and h, h1, h2 and k are independently an integer from 1 to 6; provided that at least one of R, R<sup>1</sup>, R<sup>3</sup> and R<sup>5</sup> is not hydrogen; wherein the partial condensate has a weight average molecular weight of ≤ 10,000; and

b) curing the organic polysilica partial condensate to form an organic polysilica film.

10. The method of claim 9 wherein the organic polysilica partial condensate further comprises one or more silanes of the formula



wherein M is aluminum, titanium, zirconium, silicon, magnesium, or boron; R<sup>11</sup> is (C<sub>1</sub>-C<sub>6</sub>)alkyl, acyl, or Si(OR<sup>12</sup>)<sub>3</sub>; R<sup>12</sup> is (C<sub>1</sub>-C<sub>6</sub>)alkyl or acyl; and n is the valence of M.

11. The method of claim 9 wherein the partial condensate has a weight average molecular weight in the range of 2500 to 10,000.

12. The method of claim 9 wherein R<sup>3</sup> is selected from the group consisting of methylene, ethylene, propylene, butylene, hexylene, norbornylene, cyclohexylene, phenylene, phenylene ether, naphthylene and -CH<sub>2</sub>-C<sub>6</sub>H<sub>4</sub>-CH<sub>2</sub>-.

13. The method of claim 9 wherein the device is selected from the group consisting of electronic devices, optoelectronic devices, optical devices, and display devices.

14. A method of preparing an organic polysilica partial condensate comprising the steps of: a) reacting one or more organosilanes and water in the presence of a condensation catalyst at a temperature and time sufficient to provide an organic polysilica partial condensate having a desired molecular weight, and b) treating the partial condensate with a catalyst removing agent, to remove substantially all of the catalyst.

15. The method of claim 14 wherein less than 1% of the catalyst remains after treatment with the catalyst removing agent.